

NOTES AND EXTRACTS.

In the "Zeitschrift für Meteorologie," XII, page 312, Dr. J. Hann gives a very clear elucidation of recent progress in our knowledge of the origin of cyclones, and establishes the following conclusions:

"Certain atmospheric conditions must prevail over a large part of the earth's surface before an extensive whirl-wind or cyclone can be formed; conditions which must favor an inflow of air from opposite sides towards a place of diminished atmospheric pressure, (an extensive though slight barometric depression) and favor a rotary movement. Such conditions often exist in the Bay of Bengal at the time of changes of the monsoons, and in winter, over the North Atlantic ocean, where, by reason of the general distribution of pressure, the atmosphere has a tendency to a cyclonic movement. An extended, though perhaps slight barometric depression is of itself formed between two areas of high pressure, and as a consequence of the tendency of the air to cyclonic movement. A relatively high temperature and saturation of the air with aqueous vapor can also cause a gradual diminution of atmospheric pressure, which (when the distribution of pressure over a large area favors a convergence of the air from all sides) can give occasion for the formation of a cyclone. The introduction of a sufficient condensation of vapor, seems to favor the formation of the whirl, but especially to favor its continuance, and perhaps also its progressive motion, in that it allows an easy upward flow of the air that is streaming in from all sides towards a central space, because it materially increases its ascensional power. But the precipitations in the central portions of cyclones are not their especial cause, (even if these latter are, particularly over the sea, constantly accompanied thereby) because the ascent of air cannot take place, except in very rare cases, without a partial condensation of its aqueous vapor.

"The reason why slight differences of pressure give occasion to storms of hurricane violence so soon as an opportunity is offered for the formation of a whirl, is found in the concentration of the living force of a great mass of air set in motion about the axis of the whirlwind. The greater the area over which the air is set in motion so much greater is the sum total of the living force in the central part of the storm area, but the growth of this area finds a regulator in the development of the centrifugal force and in the deviation due to the earth's rotation, both of which divert a portion of the actual energy into the potential energy of a steeper gradient.

"The preexisting opposing winds affect the formation of a cyclone only in this, that they give the impulse towards a cyclonic movement, but their intensity has little or no importance. In conclusion, a few remarks upon the role which is played in atmospheric phenomena by the heat of condensation of aqueous vapor. This seems frequently to give occasion to misunderstandings. It is not correct to speak of 'the disengagement of vast quantities of heat into the air.' Nor is it proper to say 'an unknown portion of the heat given off during the process of condensation, is undoubtedly radiated off into space. Some portions of it must, however, be absorbed by the surrounding air.' The latent heat of the condensed vapor is by the ascent of the moist air immediately converted into the work of expansion; there is no increase of temperature, neither in the ascending air nor in its neighborhood. The apparent increase of temperature is explained by the fact that ascending moist air cools more slowly than dry air. After the condensation of its vapor the air must, of necessity, be cooler than before. The part which the latent heat of condensation plays consists simply in the diminution of the rate of cooling. Ascending moist air can thus retain up to much higher elevations an excess of temperature above that of its surroundings, which excess retains for it its ascensional power, and increases the intensity of the ascending current."

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